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ABSTRACT

American universities have successfully contributed to the economic, social and technological development of the United States, educating students of diverse backgrounds and combining the teaching of graduates and undergraduates. American universities need to find ways to realistically respond to increased public expectations and continue to develop in the future. Before World War II, institutions of higher education were more differentiated in mission, with teachers' colleges, land grant universities aimed at training engineers, state universities, and a few research universities with a focus on the education of future scholars. The post-war model of the university as primarily a research institution supported by federal funding is now being challenged, as public resources for support decline. Universities of the future will need to differentiate and specialize, to cooperate, and to share resources with other institutions. The successful public university will be an active participant in issues important to its surrounding community; technology will be used to promote interaction across all sectors and to make information easily accessible; learners will be accommodated through a variety of innovations; and the ethnic diversity of the United States will be reflected in the composition of faculty, staff and students. (PRW)

THE PUBLIC UNIVERSITY FOR THE TWENTY-FIRST CENTURY: BEYOND THE LAND GRANT

by Walter E. Massey

Provost and Senior Vice President for Academic Affairs

University of California System

Sixteenth David Dodds Henry Lecture

University of Illinois at Chicago

The David Dodds Henry Lectures in Higher Education are endowed by gifts to the University of Illinois Foundation in recognition of Dr. Henry's contributions to the administration of higher education, including his career as president of the University of Illinois from 1955 until 1971. The lectures are intended to focus upon the study of the organization, structure, or administration of higher education, as well as its practice. Selection of persons to present the lectures is the responsibility of the chancellors of the two campuses of the University. Presentation of the lectures is alternated between Chicago and Urbana-Champaign.

THE PUBLIC UNIVERSITY FOR THE TWENTY-FIRST CENTURY: BEYOND THE LAND GRANT

DAVID DODDS HENRY

President, University of Illinois

1955-71

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Welcome

It's always a pleasure to have colleagues here to come together and talk about some things that are very important to the University of Illinois at Chicago, as well as to higher education. So I'd like to wish you all good morning and welcome to the University of Illinois at Chicago for the David Dodds Henry Lecture.

As I look around the room, I see a lot of people who are very, very busy. Many of you are probably thinking about the week ahead, thinking about upcoming meetings and problems and fires that you have to put out. In higher education, as in many other enterprises, we spend almost all of our time worrying about day-to-day problems or week-to-week problems. We spend far too little time really reflecting on where higher education is headed and how we ought to adjust our day-to-day decision-making process to reflect the changes that will take place in the enterprise ten or twenty years down the road. I think that's why the friends of David Dodds Henry started these lectures. It gives us all an opportunity to take a little time out from our busy day to reflect on the views of a distinguished leader of higher education.

I'm really pleased now to turn the podium over to another distinguished leader of higher education, Stan Ikenberry, who will introduce today's speaker. This may be the last David Dodds Henry Lecture that Stan attends as the president of the University of Illinois. I think he really deserves a round of applause for the tremendous leadership that he has given us during his tenure at the University of Illinois.

James J. Stukel
Chancellor
University of Illinois at Chicago

Introduction

Thank you, Jim. I come here following that round of applause to announce my reelection campaign. I take it all back, Trustees.

Incidentally, two members of our Board of Trustees are with us today, Judith Reese and Susan Gravenhorst. Stand up and take a bow.

Welcome to everybody. It is not my role to do this, but I've never been known to stay within the bounds of my assignment anyway. I just noticed the two microphones out there, and the spirit of these lectures really is to have a very vigorous discussion. So I would invite you to take copious notes on everything our guest speaker has to say and be prepared with the toughest questions that you can possibly assemble for his attention.

I want to say just a word about the lecture series and a word about David Henry. Partly, you're right, Jim, because it is possible that this will be the last time that I will perform this particular role. This has been one of the richest, most interesting lecture series in the experience of the University of Illinois. It's one of the few lecture series that involves both of our campuses, alternating each year, first on one campus and then the other. That alone, I suppose, sets the David Dodds Henry Lecture series somewhat apart. But it is also interesting that we have had over the years a really remarkable assembly of distinguished lecturers as part of the series. And today, I think our speaker is exemplary, if you will, of that tradition.

Just a word about David Dodds Henry, the twelfth president of the University of Illinois, still alive and well and kicking. So old presidents really don't either go away or fade away. They're just out there. But he is alive, is well, and lives in Florida.

He served as president of the University from 1955 to 1971, a period of remarkable growth in all of higher education. Expansion, both in terms of

numbers and the expansion of the idea of what a university is and what it can do and should be doing in the society, really took place during the David Dodds Henry era. And that expansion for the University of Illinois took place predominantly here in Chicago. My view of the Henry administration is that Dr. Henry's greatest gift to the University of Illinois was to design a plan for the long-range growth of the University that was academically sound.

I came here from a university that had 60,000 students, and many universities just like Illinois have 60,000 students, except that the university I came from had twenty-two campuses. This University was smart enough to organize 60,000 students on two campuses, and it makes all the difference in the world in terms of the quality, depth, and vitality of the academic program.

David Dodds Henry was then, is still, a student of higher education in our country. He was a member of Clark Kerr's Carnegie Commission, which, for those of you who were following the literature, during that era produced a literal bookcase full of reports and studies on every aspect of higher education. There really has never been before, nor has there been since, quite a comparable set of studies on the future, the nature of higher education in this country. Dr. Henry was a member of that commission. He chaired all three of the higher education groups in the country: the American Council on Education, the Land Grant Association, AAU. Along with John Hanna at Michigan State, Herman Wells at Indiana, and Clark Kerr in Chicago, he was truly one of the giants of that period.

In his own way, we're talking about another of today's giants. Walter Massey is one of the nation's most respected scientific and academic leaders. The good news is he belongs to Illinois. He got his formative training and his professional ethics and his insight into science policy all

during his two or three years as assistant professor of physics at the University of Illinois at Urbana-Champaign. I'm sure that he will bear me out when I say that Walter and Shirley also have been long time members of the city of Chicago. Shirley, I think, is here. Shirley, stand up and take a bow. We're very happy that you are here today.

Walter has had a long, rich, productive tenure as part of the academic family at the University of Chicago, beginning first in an academic role, expanding as the director of the Argonne Laboratory and continuing through the vice presidency for research at the University of Chicago. He continues to this day to have very deep and continuing roots in the city of Chicago.

His life goes back to Mississippi where he went to high school, to a baccalaureate degree in physics and mathematics from Morehouse College, to a Ph.D. degree fromWashington University in St. Louis, post-doc at Argonne Laboratory from 1966 to 1968, and from there to a very distinguished career that included not just Illinois, but Brown, the University of Chicago, and now the University of California.

His field of study is one that I consider myself an expert on as well, the study of quantum liquids and solids. But because I don't want to upstage Walter, I'm not going to say anything more about that. I won't steal his thunder.

He has been a major contributor as well in the field of science policy in this country. First and foremost, I suppose, or at least the most obvious in that role, was his extremely successful tenure as director of the National Science Foundation from 1991 to 1993. Many of us were concerned about the future of that very central agency, crucially important to the future of science in this country, and were reassured when Walter went to Washington to lead the National Science Foundation. In addition to the distinguished

academic careers at Illinois and Brown and Chicago, he assumed the post of provost and senior vice president for academic affairs at the University of California in 1993. I think it must be added with some considerable and obvious envy that he assumed the Provost position at what we must probably conclude is the nation's premier public university. It is probably the nation's public university that also has gone through a tougher time in the last three or four years than any other public university system in America. At the same time, having come through that remarkably well and still to this day, it is a model for what can be created in public universities across this country.

No one who has delivered the Henry lecture comes better qualified to speak on the public university for the twentieth and twenty-first centuries beyond the land grant. Walter, we're very, very honored and delighted to have you with us this morning. Welcome to this podium.

Stanley O. Ikenberry
President
University of Illinois

The Public University for the Twenty-first Century: Beyond the Land Grant

by Walter E. Massey
Provost and Senior Vice President for Academic Affairs
University of California System

It is a pleasure to be invited to give the David Dodds Henry Lecture. It is always wonderful for me to have an opportunity to return to Chicago and to the University of Illinois in particular. I have a long history with the University of Illinois. My first academic position was at Urbana in 1967. Some of the reasons I was attracted to the University of Illinois at that time are related to issues I will speak about today.

I had been a post-doc at Argonne, doing research during the mid-1960s. It seemed to me that all of the relevant action concerning major societal issues was being addressed on university and college campuses. As some of you may recall, this was the time that campuses were being racially integrated, in many cases for the first time, by large numbers of minority students, then mostly African-American students. The campuses were in turmoil due to the changes in culture that resulted from the infusion of large numbers of new kinds of students. I felt that being in a research laboratory without an opportunity to interact with students and faculty or to be involved in teaching and in working with this new generation of students left me somewhat unfulfilled. Furthermore, fortunately for me, the Physics

Department at Urbana at that time was one of the best if not *the best* in the nation in my field of theoretical many-body physics. The combination of being able to join such a distinguished group as Bardeen, Kadanoff, Baym, and others *and* to be involved in these other kinds of issues was irresistible. You will also recall that this was during the height of the Vietnam War and the war in Cambodia.

Conflicts on campuses were not just racially related, but involved larger issues such as the role of universities in the war effort or in the war-resistance effort. Attention was also being paid to cities again—urban studies, a relatively new discipline, was being established on various campuses. And physicists, of all people, began to become interested in applying various mathematical techniques and physical theories to the study of urban problems. The Center for Advanced Study at Urbana brought together a group of physicists, political scientists, sociologists, and economists to try to establish programs that might lead to some understanding of urban issues such as education, economics, and the sociology of urban life.

This was a fascinating and engrossing period, even though the turmoil and conflicts caused many unfortunate circumstances in universities, dividing faculty, students, and the community along ideological and political grounds. Universities moved more and more into the forefront of public consciousness, and public issues moved more into the consciousness of faculty, who had in many cases been quite cloistered from these kinds of issues.

Much has changed over the past twenty-five years, but some of the same issues are still with us, and universities are again struggling with ways to contribute to the solution of old problems *and* new programs in many of the same areas.

Universities were under a great deal of stress then, and they are so now. In fact, one might paraphrase Charles Dickens by saying, "These are the best of times and the worst of times" for universities. No pun intended, but the public has "Great Expectations" of us, and it is not clear that we can really meet all of those expectations.

In one sense these are "the best of times." It is certainly the case that American universities are one of the great successes of the twentieth century. These institutions have played key roles in the economic and social development of our nation. They contributed to the founding of many of the great industries in this country, and they have made the United States highly competitive in new technological areas such as semiconductors and microelectronics, and the world leader in such new areas as biotechnology and pharmaceuticals. Also, despite some obvious failings, American universities have been quite successful in educating generations of Americans from backgrounds that cut across racial, ethnic, and economic groups. One can say this in spite of the conflicts of the 1960s and the conflicts that are still with us. No other institutions in the world have educated such a diverse set of students. And the education has not been confined to American citizens. Thousands of foreign students have passed through our doors. Many remain here to contribute to the welfare of the United States, but others have returned to their native lands and have become important allies and supporters of the United States abroad.

Despite criticisms and concern about undergraduate education, I would argue that universities in the United States have been quite successful in combining the teaching of undergraduates with graduate training and research in a way that is special if not unique to these institutions.

The research and scholarly community in the United States is also stronger than it has ever been, no matter how it is measured. We have more

excellent universities engaged in research and teaching, and there are more and stronger departments in more institutions than there have ever been. More students are entering and graduating with advanced degrees, and discoveries are emanating from our universities at an unprecedented rate.

Universities also continue to contribute to the nation and their communities through public outreach activities— not simply through the spinoff of businesses that lead to economic development, but through programs that directly contribute to the well-being of the communities in which these institutions are located.

If we were to stop now and the story ended, one would certainly say that the history of the American university has been an unparalleled success. But it is not an exaggeration to say that at this time of our greatest success, the system is, as I said earlier, under a great deal of stress. And much of that stress seems to be the *result of the success* in research, education, and outreach that these institutions have achieved. These successes have led to greatly increased expectations on the part of the public. Some of these expectations are new and some are expansions of old themes. For example, practically every state and region would like to have a so-called "world-class" university with the expectation that it will lead to a new Silicon Valley or Route 128 or Research Triangle. Communities expect to see the results of investments in universities on a much shorter time scale and in a much more visible way than has happened in the past.

Universities are being asked to play a greater role in other problems that have been less directly connected with their traditional roles and expertise. K-12 education, for example. This *is* a major national problem, and all sectors of society are being asked to contribute to the improvement of our schools. So it is not surprising that universities would be expected to play an even greater role, given that we train future teachers, generate the

knowledge that pupils will be expected to learn some day, and develop the technologies that might be utilized to improve the quality of education. But these expectations may surpass our capacity to respond.

In the area of social and human relations, universities are expected to be able to bring together ethnic and racial groups on our campuses and be exemplars in establishing harmonious multiracial, multiethnic communities in ways the general society has yet to achieve. It appears that there is almost no problem of national scope to which the universities are not expected to make an important contribution. Perhaps this is not unreasonable; however, the degree to which universities can really meet these expectations is questionable, in my opinion.

As I said earlier, our successes have in many ways led to these increased expectations because in the past universities have been remarkably successful in dealing with other problems that the nation has faced. After all, universities were successful in accommodating the huge wave of new students following World War II, who entered under the G.I. Bill—many of whom were first-generation college and university attendees. And of course the nation turned to the universities for the brain power to develop the technologies that led to the Allied victory in World War II.

However, the paradox is that at the same time that the public expects universities to contribute more and more in an increasing number of areas, the university community has come under greater attack and scrutiny from the outside. The accusation that universities have mismanaged government funds, especially indirect costs on research grants, has become a *cause celebre* over the last few years. We are all familiar with the congressional hearings, investigations by federal agencies, and articles in the national press, both scientific and popular, painting an image of universities as inappropriately using federal funds that should have gone to support

research and education. "Arrogant and indifferent" were adjectives used to characterize the leaders of some of our great universities. Also, issues of fraud and misconduct in scientific research have led some to question the integrity of the academic research community, asking if the community has lost its bearings with respect to truth and integrity in the conduct of research and whether or not the community is capable of policing itself. I find the use of the word "policing" somewhat depressing, implying that the community consists of miscreants and ne'er-do-wells who need supervision.

In spite of this, there is still very strong support for universities in this country. Many of our critics evince more disappointment and surprise than anger even as they level these accusations. I think this is because universities have been held to such high standards, and in fact have met those standards in the past. Therefore these instances of improper behavior, no matter how small, take on much wider importance. There is a sense of these institutions having "fallen from grace."

How should we in the university community respond to these increased expectations and growing criticisms, and how can we prepare ourselves so that we can be as strong in the twenty-first century as we have been in the past?

First, it is important to have a sense of perspective. As Al Bowker, a former chancellor of the University of California at Berkeley, noted in respect to times like the present, "Higher education is not as important as it thinks it is, but it is more important than anyone else thinks it is." In order to think about the future and to develop some perspective, we might dwell first a bit on the past. Knowledge of the history of universities in this country is important. I have found that putting situations in a historical context can give one a different perspective on the issues.

An anecdote told to me by my predecessor in my position as provost at the University of California, Bill Frazer, illustrates this. The University of California helped to develop a new American University of Armenia, and Bill was asked to participate in the opening of the university two years ago.

At the opening ceremony, the patriarch of the church in Armenia, a branch of the Orthodox Church, blessed the facility, the faculty, and the students. The patriarch gave an impressive speech about the future of Armenia now that Armenia had separated from the former Soviet Union. Later, Bill asked the patriarch about how difficult it must have been under the Communist regime for all of those years and how pleased and happy they must be now to finally be from under the yoke of Communism and the Russians. The patriarch replied, "In the history of the church, it's not the worst of things. So we had seventy bad years!"

As I have noted, some of the concerns expressed now were certainly with us in the 1960s and 1970s, but they began even before that period. The American public has always expected a great deal from its universities, but has also been ambivalent about the role of these institutions. The first colleges in this country predated the founding of the country itself. They were small, focused institutions mostly developed to prepare ministers for the growing number of churches in various denominations in this country—Harvard, Yale, Princeton, Brown, etc. These schools served the public, at least a small segment of the public, but were not intended to be institutions that contributed to the solution of national problems.

Some of our Founding Fathers recognized this, and James Madison at the Constitutional Convention in 1789 proposed the founding of a "Federal University" that would serve the nation as a whole. The idea of a federal or national university was an ongoing consideration throughout the eighteenth and nineteenth centuries. The Land Grant Acts of 1862 and 1890

were landmark decisions in recognizing the importance of higher education training for a broader segment of the public in order to develop special skills that the nation needed and to provide services in key areas of national importance. The Morrill Acts are usually thought of as providing support to colleges or universities to serve a growing agricultural enterprise in the nation. However, the need for engineers and technicians to build the nation's infrastructure, such as roads and dams and factories, was as great a motivation for the founding of the land grant universities as was the need to serve the agricultural communities.

The language used to describe the functions of these institutions was that they would be devoted to "the agricultural *and* mechanic arts." These institutions very soon grew beyond even those somewhat well-defined areas and developed a full spectrum of academic programs and became, in many ways, indistinguishable from the state universities that were being developed in the same period. In many cases, the land grant and state universities were one in the same. The founding of Johns Hopkins, the University of Chicago, and Clark University near the turn of the century created a new model of the university to serve other needs. These were the first American universities founded to produce scholars and carry out research with an emphasis on graduate education rather than undergraduates, and with no particular focus on serving public needs. These institutions were developed to create an environment *where the faculty* would determine the direction and nature of the scholarship and research, rather than being devoted to solving problems of local or national interests.

Of course, the founders of these "research" institutions, as well as the nation's leaders, recognized that no country could aspire to be great without having universities of this type—universities devoted to educating new generations of scholars and to pursuing scholarship and research at the

frontiers of knowledge. The great German universities and the great German industrial sector provided the model and expectations for these institutions. During the period from the founding of the land grant universities until World War II, universities in the United States were fairly distinguishable from one another. In any given state or region, one could easily find a teachers college or university, or a normal college, devoted to training high school or college-level teachers. The land grant universities were in many ways distinguished by their great involvement with the rural sectors and their emphasis on the training of engineers. State colleges and state universities addressed a broader spectrum, providing education in the liberal arts as well as graduate education in the traditional disciplines. And there were a few national universities, one might call them, that combined undergraduate and graduate education with a strong tradition and focus on discovery as well as the education of future generations of scholars and researchers.

After World War II, the landscape became much more homogeneous. Institutions that were formerly state teachers colleges became universities and in many cases labeled themselves *research universities*. Normal schools ceased to exist and the distinction between the land grant, state universities, and the national universities became less and less. Most institutions aspired to a common model: educating undergraduate and graduate students, but with the reputation of the institution being built primarily on the reputation of its faculty in scholarship and research. Much of this change was due to the infusion of funds by states and especially by the federal government into the university community. Federal funds went to support faculty in particular areas of research and scholarship, mostly in the sciences and engineering, and to support the infrastructure of institutions aspiring to this "research model."

Between 1957 and 1994, federal obligations for R & D support to colleges and universities grew from $224 million to $11.64 billion, a fiftyfold increase. (This is in current dollars.) Overall, the U.S. system of research-intensive universities is roughly three times the size it was just thirty years ago. The capacity to produce Ph.D.s is more than ten times what it was immediately following World War II. This "research" model of the American university as we know it today is really a relatively recent phenomenon in American history, dating from the period following World War II. One might wonder, then, is it reasonable to try to project and extrapolate the future of these institutions from this relatively brief historical period? It *may* be reasonable, but it is a question we must ask ourselves seriously and examine very carefully before we commit ourselves to such an extrapolation.

The landscape and the environment that we have lived in and enjoyed for the past forty years seems to be changing. The end of the Cold War is a major indicator of that change. But it is only one of several events that should cause us to reexamine some of the assumptions that have guided us in the past. The research scene is changing. Federal agencies, scholars, and elected officials are asking whether or not there should be a new paradigm for the federal government's support of research in general and university-based research in particular. Representatives in both the House and the Senate are asking who should determine the priorities for research supported by the federal government. Should it be the scholarly community as it has been, by and large, for the past forty years? Or should certain areas of research be aligned with national need as defined by our elected officials?

In many states around the country, the proportion of funds going to support public universities has decreased over the past several years. In California, we have seen this to an extent that is unparalleled anywhere else

in the country. The sheer size of California makes our problem different in scope, but not in kind, from what is happening in other areas. Such prestigious groups as the President's Council of Advisors on Science and Technology have asked whether or not we already have too many research universities. And underrepresented groups still question the academy's ability or desire to accommodate them within the ranks of university faculty.

How should we begin to prepare ourselves for the twenty-first century? I certainly do not have *all* the answers, but I do have some suggestions, drawn from a lifetime in this enterprise, and some advice based on our recent experiences in the state of California.

We probably have to accept the fact that neither state nor federal resources will grow as they have over the past fifty years, and therefore the support for universities from these sources will decline in a relative sense. This means that we will have to curb our appetites and realize that not every institution can be all things to all of its constituents. We will probably have to differentiate among institutions more than we have in the recent past—since World War II. Institutions will need to focus on their areas of relative advantage and not attempt to fit into a common national mold. We will be required to use all of our resources more wisely, *and* we must be able to *demonstrate* the wise use of these resources to the public that supports us. More cooperation among institutions, among universities and national laboratories and industry, will be necessary. Technology will be a great aid in allowing this kind of cooperation and interaction, by making geographical proximity less of a barrier to cooperation and sharing of resources.

We will need to respond to public expectations that we can address economic and social issues, but we should respond in a realistic manner, in a way that does not overpromise the contributions that universities can make in these areas, in particular in such areas as K-12 education and the

problems of urban communities. The Great Cities program that you have recently instituted seems to me to be a model of a realistic and pragmatic approach to contributing to the community, based on the core strengths of the university, not through the creation of ad hoc or ephemeral satellite institutes or programs that are not embedded in the essential activities of the university.

Finally, universities really must make a more serious effort to produce the next generation of scholars to reflect the ethnic and racial diversity of this country and to include members of those groups within the faculty of the academy. If we do not draw upon the talent pool represented by this growing new population, who are an increasingly larger number of our society, not only may we lose the support of a large portion of the public for our enterprise, but we may be unable to produce the scholars and teachers we need for the future.

California is a case in point, perhaps the most visible case in point in this regard. In 1992, minorities comprised 46 percent of California's population. By 2003, that will be more than 50 percent. The majority of California's population will be minorities. At the University of California, more than 45 percent of the undergraduates are from minority groups, about 30 percent of the graduate students and about 15 percent of the faculty. California's configuration and ethnic makeup is not reflective of the nation as a whole, but it is reflective of many of our larger urban areas and of the direction of population changes in the country.

If we do respond to these changes and make the necessary adjustments along the lines that I have suggested, what will the university of the twenty-first century look like?

Well, predicting the future is a hazardous undertaking. As Garrison Keillor—the sage of Lake Wobegon—said in yesterday's *New York Times*,

"The future is uncertain—even in the past the future was uncertain." Nevertheless, here are my views.

First, not all universities would look alike. There would be increased differentiation, with universities emphasizing and concentrating on their strengths and sharing those strengths with other institutions in a cooperative manner. However, there are some common characteristics that in my opinion would provide for a healthy and vital *public* university, a university whose mission combines teaching, scholarship, and public service. I would certainly include the University of California and the University of Illinois in this category. For example:

- First, such an institution would be part of its environment, whether it is in an urban area or a college town or rural community. The institution would not be a cloistered entity; it would contribute to national issues, but would also be involved, through its teaching and research, in activities relating to its surrounding community in ways that contribute to the health of the institution as well as the health of the community.

- Second, technology would be ubiquitous, allowing and promoting interactions across all sectors, between and among disciplines and departments, and between student and teacher at times and in ways not restricted to the classroom or lecture hall or laboratory. Access to libraries and other sources of information by the public would be common, and the knowledge generated and the information stored would be easily accessible to people inside and outside the university.

- Third, the institution would accommodate learners through a variety of means: through distance learning, access to disks, tapes,

and other information storage systems, or by direct access through technology. The variety of learners served would be much more varied than today by age, social background, and economic position.

- And fourth, the successful public university of the twenty-first century would reflect the rich diversity of this nation, among its student body, its staff, and its faculty.

I do not think this future will have to be orchestrated through "master plans" developed by the administrative leadership of these institutions, although that would certainly help. But in my opinion, these kinds of changes are almost inevitable, given the needs of the generation of students we will be serving, the pace of technological development, the expectation of the communities and the publics we serve, and the creativity of our faculties. These factors will come together in a way that such changes will almost surely appear in those institutions that grow and remain healthy. Maybe not every change will take place at the same pace, but the great public universities of the future will embody these characteristics. Certainly the University of Illinois at Chicago will be one of the great public universities of the twenty-first century. In fact, I am struck by how many of these characteristics you seem to already embody.

Again, thank you for inviting me to participate in this lecture series. I intend to return, invited or not, at the turn of the century to verify my prognostications.

Questions and Discussion

Irving Miller, Professor and Head, Department of Chemical Engineering, andDirector of Bioengineering, UIC: I am concerned with a message I need to provide to new faculty members who come into engineering these days. They come in typically with education in science, with post-doctoral training, and they come in with expectations for a career that will be largely research oriented. The message we provide now is that the research they were trained in may not be quite as important as other things such as teaching and service for which they are not well trained. They are not comfortable with that. They say the only way they'll get tenure is by getting grants, and I tell them that grants are not as easy to get as five and ten years ago. I wonder if we are doing them a service in the way we train them. What are your comments about that?

Dr. Massey: I certainly agree with your reading of the landscape. As I said, we don't expect the growth in federal funding we've enjoyed since World War II to continue at the same pace. Yet we produce Ph.D.s in science and engineering. I think there are ways in which these individuals can make as great a contribution as they have made in the past, following their traditional careers.

But you are right; those careers and patterns won't be the same. What I tell students is, you can't expect that all students will get their Ph.D., do a post-doc, and become faculty members, just as their mentors did.

There are implications in the way we train graduate students. We can't train them as narrowly as being a sole apprentice to a sole mentor; we have to allow them experiences in graduate schools that cut across different areas, such as doing research in industry while they are in school. As you

may know, the National Science Foundation just initiated new post-doc and graduate programs to do that.

So, while there is going to be some pain in this transition, I think in the long run this can work out to be very healthy. Changes in the institutions are the most difficult part. We are undergoing a very vigorous debate within the University of California on the reward system. What do you really do to reward faculty who might be at a point where they want to put more emphasis on teaching or public service than on research? That is not an easy issue.

LANSINE KABA, Head, Department of African-American Studies, UIC: We are very grateful to you for this presentation. I was interested in your reference to the international dimension of higher education and the service rendered by American higher institutions to foreign countries. I would like you to address this aspect a little more because the world has changed and the economy of the world is more than ever interdependent and yet competitive.

You referred very wisely to the German model, which American higher education imitated. And today we know in Germany, France, England, Japan, China, and the former Soviet Union, even in Nigeria, there are public institutions trying to enter this area of success realized by the Americans.

I would appreciate hearing any ideas you have. I feel that in the twenty-first century the institutions of higher learning might also become alike. What do you think?

DR. MASSEY: I agree with your view that the world is going to become more and more global in its ability to communicate, to work together across boundaries; it's already happening. I see it as a great opportunity for higher

education generally, because there are areas where there still needs to be growth and development in some of the countries you mentioned. And I think American universities will probably again be able to provide a great deal of the leadership.

One of the somewhat controversial issues raised over the past several years, as it relates to the earlier question about the job market for scientists and engineers, was whether U.S. universities were enrolling too many foreign students, especially in engineering, when in many schools more than half the graduate students are from abroad. I don't think so. First, many of the students stay here and provide the kind of resource that the nation needs. But, second, many go back and help to contribute to development around the world, raising the intellectual, educational, and, hopefully, the economic level of those countries. In the long run, that can only be good for the United States and the world.

It's a legitimate question to ask, but I don't agree with the prognostication of oversupply at this point. I suspect most universities are doing more to provide students with access to foreign experiences and to make sure that in their undergraduate education they begin to have an international perspective, because that is going to be the world they live in, no matter what their discipline is.

AL MASSEY, brother of Walter Massey: With the cost of higher education continuing to grow, and a decrease of public funds, what effect would this have on African-American students' opportunities for higher education?

DR. MASSEY: That is a real worry. I will use California as a case in point, because it is illustrative of the dilemma that will, I think, happen elsewhere. The state of California has probably been the most generous supporter of

public education of any state over the years. It has built what many believe is probably the finest public university in the world. And it built that through low costs. In fact, there is still no "tuition"; the word "fees" is used. And there is a difference. Fees cannot be used to support instruction—faculty salaries, instruction, or libraries. Fees can only be used to support things related to student services. But we changed that last year and now use fees for everything. Fees have gone up 125 percent in the last three years; still only $3,000 or so, which is cheap by national standards. But they are going to go up. The public state support is not going to go away, but it's not going to grow at that rate. And this is when the growing population is more and more made up of those groups that were previously under-represented.

The dilemma we face is: how do you provide access to this new generation of students at a time when the rate of growth of support from the public is not likely to be what it was in the past? How do you do that in such a way that you don't dilute the quality of the whole institution? I don't have the answer to that, but it is one of the things that we're all struggling with now.

NANCY JOHN, Assistant University Librarian, UIC: I heard you say that without a master plan we can transform the university, leverage our meager dollars and meet our primary missions of teaching and research, through the creativity of our students, faculty and staff. Presumably there are some support mechanisms that are going to help the university to do that. Ubiquitous technology and a reformed reward system for faculty are two you've talked about. Are there others?

DR. MASSEY: I didn't quite say that this would happen without a master plan. What I said is that for successful universities—those that survive and are successful—those elements are going to characterize those institutions. And they may come about in an unplanned way, but they are bound to happen. They are just bound to happen. The student population will change. Students are going to come expecting more and more electronic technology. Our faculty are going to use it. The public is going to get used to access and sources of information from anywhere it wants, and if a university sits there in the community as a repository of information, it is going to have to provide ways to access it. So I think universities that do not do that will not be successful; that is what I meant.

What are the other things that can aid that along? Faculty reward system, the use of technology. I think building ways in which community relationship can be structured in a way that is mutually beneficial for the missions of the university, as well as for the legitimate needs of the community, is important.

Now what do I mean by that? I mean the expectations from the community can be so unrealistic and the university's ability or desire to meet them can result in the fact that the university simply starts to do things in which it has no particular expertise, or that are not related to its core mission. I do think this Great Cities program—I just read about it—if it works like that, it may be one of the things that also has to be done.

JAN ROCEK, Vice Chancellor for Research and Dean of the Graduate College, UIC: You said, and this is not the first time we heard the message, that not all universities can do the same thing. We have to specialize more. We have to focus our resources. The fact is that the history of recent, or not so recent, years has been exactly the opposite direction. We had teachers colleges that

disappeared. We had schools that focused on engineering or on agriculture and that are now much more similar to all the other institutions. So my first question is: Do you see any development in the opposite direction? In the direction of more focusing, more specialization?

The second question is the following. California is unique in the country in the sense of having clearly defined two systems of higher education with very different missions, different funding patterns, different expectations. Do you see that there is a likelihood that, with reduced or in sufficiently growing funds, there may be similar formal or informal development on the national scene, that is, somehow more formally recognizing such universities where the funding for research would concentrate and—perhaps the wrong term—"teaching universities" where the level of research would be funded at a much lower level, and their expectations would be much, much lower?

DR. MASSEY: Well, in terms of the first question—do I see any visible signs that this differentiation is coming about?—not many, to be frank. I think the aspiration to the common model of the national research university is still the predominant paradigm. So we are just seeing that, but it can't happen, it can't survive. It can't be a successful model in the future because those funds are just not going to be there.

So what will happen? Some institutions will become second- and third-rate research universities. They just won't be successful. However, I do see signs of a few institutions looking at their areas of strength. It doesn't mean that they will not do research. I don't think that will happen. I think there will still be a balance of research, scholarship, and teaching in the institution, but they will not aspire to have every department, every area of knowledge, be one in which they have to excel or in which they will have to

be number one. So I see the differentiation more and more along the lines of strength and foci, rather than on teaching and research.

I think it would be very difficult to emulate that model in California in a formal way. Most of the faculty in the Cal State system, which is the state university, don't give Ph.D.s, but want to give Ph.D.s. That is what they want to do. They want to have joint programs and give Ph.D.s. So I think pushing teaching versus research as the focus of the institution probably will not be the way it will go.

WILLIAM TROYER, Professor of Medicine and Chief of Staff at the University of Illinois Hospital, UIC: Most of the things driving the information explosion during the twentieth century were things that came out of physics and chemistry. I think there is going to be an equally powerful driving force in the twenty-first century, and I'd like to hear your comments on it. One is genome, and two is the explosion of information in the neurosciences. Those are going to give everybody in this room, even if they are not a scientist, plenty of things to work on, such as the age-old question of nature versus nurture, ethics, and so forth. I am kind of surprised to hear you predict a static period for universities because I think the need for this information is going to be even greater than it has been in the twentieth century.

DR. MASSEY: I don't think those are necessarily dichotomous positions. I think the need is going to be greater. I don't think the resources are going to be thereat the rate they were in the past. Some areas such as you mention—the information area and the biological area—are growing, and now seem to be the places where a lot of the excitement is. But if you look at some traditional areas—and you know the fate of the superconductor and super collider—and if you look at some other areas, that is simply not happening.

Your future is not necessarily at variance with what I said. We are just going to see a redistribution of resources.

If you look at the growth rates in the 1950s, not just in research but in funding of institutions and during the 1960s, how did these teachers colleges and local places become research universities? A Centers for Excellence program run by the National Science Foundation developed computers and funded departments liberally. The Department of Defense before the Mansfield Act, which stopped them from funding civilian research as generously, was funding through the Office of Naval Research and Air Force Research. That was an era that is difficult for me to see repeated. I just don't see where the dollars are coming from. There is a freeze on the federal budget for the next five years. A freeze. Which means that unless defense spending goes down much more rapidly than it has been, there is going to be very little growth on the civilian side of the budget, and research and support for higher education are right in there in the discretionary budget.

I agree with you about the excitement and the need to have people develop it. We may find other ways to support it, through consortia or private industry and the like. I just don't see us repeating in the next twenty years, the turn of the century, that period. That's all I meant. I'm not a pessimist. Seriously, I should say that. I don't want you to believe that because that, is my prognostication for the future, I don't see higher education as being able to really thrive in this new environment, but to do it we are going to have to do some of the kinds of things that I mentioned.

LAWRENCE OFFICER, Associate Dean, College of Business Administration, UIC: I was interested in your statistics on diversity in the California system: undergraduates, graduate students. I wonder if you have a trickle-up

theory. If we wait long enough, are we going to get a diverse graduate student and faculty group, as well as our undergraduate group? Or do we have to change our policies in some fundamental way?

DR. MASSEY: You are right, I hadn't thought of that. I'm sure if I had given this talk in California, people would have immediately caught the numerology because it has some mystical meaning, I'm sure. In this new-age world, you know, everything has some mystical quality. I don't think it is going to come about naturally. Those numbers will move up. We still lose many people at the upper end, between the transition from undergraduate to graduate. That's where we have to put most of our attention. The undergraduate population is just going to grow, and the sheer size of the population will push changes. I don't think it is inevitable that it will result in proportional growth in the faculty and the graduate area, unless we do put in extra efforts. I would not say we should change our policies so much as continue to devote targeted efforts at that problem.

MYRNA ADAMS, Associate Chancellor and Director of Affirmative Action Programs, UIC: My comment does not direct itself to affirmative action, but rather to the growing tendency I see and hear, that to spend money in these tight times on the poor and the disadvantaged and those whose test scores seem minimal is really a waste of resources when in fact, there are major scientific and other projects not only the more endowed and enlightened are capable of carrying out. I am wondering, as we enter in this period of reduced support for higher education, whether that mentality and the public policy is, in your opinion, likely to get stronger and have more support among political leaders and heads of institutions?

DR. MASSEY: I don't know the short answer. But I think if the economic conditions ofthe nation don't turn around sufficiently—certainly in some areas—then the problem is going to be exacerbated. Whether it is a simple matter of economics, and if we have a boom economy that people will be more tolerant, I don't know.

I think there is a problem there, in addition to exacerbating by what is perceived to be, and in some cases will be, a declining market in some areas. Well, many schools speak with people who are doing this, putting efforts into recruiting more of the under represented groups into engineering. So one might ask a legitimate question: Why are you doing that? Is it really an appropriate use of resources to recruit more people into a field that does not seem to be growing or able to absorb them at the same rate? I think we are going to hear more of those kinds of questions.

There is a return—and it seems to be cyclical since I've been in higher education—of the visibility of the debate of IQ scores. Most of you have seen this new book *The Bell Curve*. It is the same research that Arthur Jensen was doing at the University of California at Berkeley in the 1970s, and Richard Hernstein, who coauthored, was doing at that same period. There is nothing new in the data, but in certain times you find people much more receptive to these ideas, and that seems to be the case now. I really don't know if it is just driven by economics or a sense that perhaps these programs are not working. They have not worked. We still have poverty. We still have divisions in society and, therefore, maybe it is not worth the investment. So that is one that I am even hesitant to predict about. I must say, however, at least among people we deal with, there is still a very strong commitment to these kinds of programs.

In spite of the fact that these questions are being raised again, I am

not pessimistic about the commitment.

JAMES HO, Professor of Information and Decision Sciences and Director of Applied Research and Consulting Services, College of Business Administration, UIC: I would like to follow up on your recognition of the role of technology in the future of higher education and education in general. I believe that the impact of technology is what can be called two things: first, what can be called "deliveration" of the mass market. We're moving away from the mass production you want in marketing. The consequence of that in the context of education is that we must move away from the model of the factory. After all, teaching is managing, and learning has been pretty much mass production up to now.

The other impact is what can be again called "deliveration of professional knowledge", so-called gate keepers. We witnessed the elimination of layers of middle-management jobs in all kinds of organizations and enterprises, mainly because what they used to do is just funnel information up and down the hierarchy. Now, with technology, a lot of that can be done away with. With that, again, in the context of education, I believe that we can be moving away from what some people have described as a role of "sage on a stage," to what can be called "guide on a side." And if we believe in that, changing of a role would have tremendous impact on our own perception or preparation and how we carry on with our job and career.

I would like to have your opinion on those two aspects of impacts of technology.

DR. MASSEY: I think you've just said it all; I certainly agree with that. Back in 1970 or so, I taught a course at Brown called "Using the System," a personalized system of instruction, where you did not give lectures except on general topics. And this was in physics, real physics. Students could move at

their own pace. Whenever they had assignments, I would help them. I had tutors to help work with me. Whenever the students felt they were at a point to take an exam to show they had mastered those topics, they could come in. They could do it anytime they wanted to. Some would do it in a day, some took two weeks. But if you took one exam on that subject and failed, you couldn't take the same one. So I had to write four and five different examinations for each topic. I had this massive file drawer of exams and papers and graphs to follow student progress. I could do that now on a desktop computer, with minimal power.

The management of information and ways to teach, I agree with you, are going to be so much simpler now with technology. That's one example.

The other, I don't think students who have been raised on Nintendo and who are used to manipulating joysticks are going to sit in a lecture hall and watch somebody write on a blackboard. They won't show up. They will sit in their rooms and access the information other ways, through CD-ROMs or through direct sources. That is what I meant when I said I am not sure it is going to take a master plan. I think a lot of this is going to be driven by the changes themselves.

CHANCELLOR STUKEL: I will begin by thanking all of you again for coming this morning. It was a very interesting lecture. I would like to thank the president for coming, and Mrs. Ikenberry, who was with us last night. And of course, more importantly, I would like to thank both Walter and Shirley for coming, because they are coming back to Chicago. They had been here for many, many years.

I would like to make the observation that, while all of our David Dodds Henry lecturers have done a really superb job, in looking at the

content and the relevance of what Dr. Massey told us this morning, this is the best. It is the most relevant. It is the one that targeted us in terms of things that we are talking about on the campus right now. So we are particularly grateful to you for having done your homework and giving us a superb talk. Let's give a round of applause to Dr. Massey. Thank you for coming.

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